A Nonlinear Programming Technique For Reinforced Concrete Modeling

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Modeling with non-linear materials is now included in the analysis methods demanded by the regulations such as TBDY-2018. Many pushover analyzes use nonlinear models for bar mechanics, often lumped and distributed-described on a cross-sectional basis. In this study, a nonlinear material model for concrete and reinforcement was created in order to establish numerical models of two-dimensional reinforced concrete membrane problems. Based on the Druker-Prager model for the concrete material, the setting zone is defined as a multi-part linear curve. In addition, the open region of the conical yield surface is covered with a circular cap in the p-q plane. The Mandel concrete model curve, which was expressed in TBDY-2018, was chosen as the concrete stress strain curve. The reinforcement was taken into account according to the von-Mises criterion, and hardening was not defined in the non-linear part. In this direction, an appropriate methodology has been developed to provide solutions.

Keywords: *A capped Drucker-Prager Model, Hardening in Concrete, Mandel Concrete Model, Nonlinear material model, von-Mises Reinforcement Model*